

EPA's Data Analysis and Reporting Tool (DART)

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on behalf of the
EPA OAQPS PAMS Program

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Sonoma Technology, Inc.



Acknowledgments

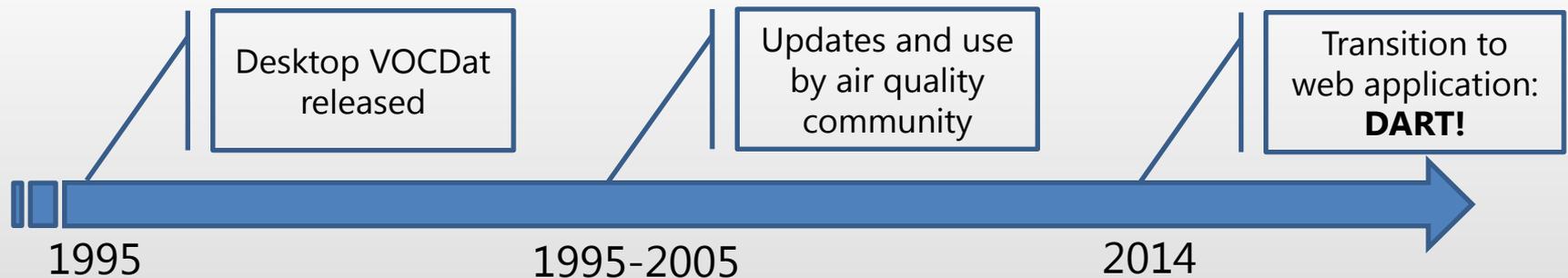


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Jennifer DeWinter, STI
Steve Brown, STI

With excellent
feedback and ideas
from NACAA Steering
Committee

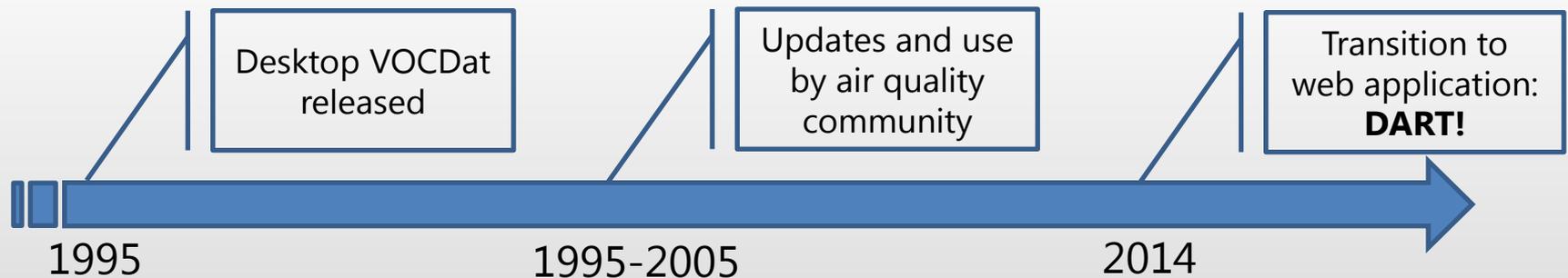
DART History

- Formerly VOCDat, a desktop software program
- Used by PAMS community to validate VOC data and prepare data for AQS submission
- Used to analyze carbonyls, air toxics, and speciated PM_{2.5}



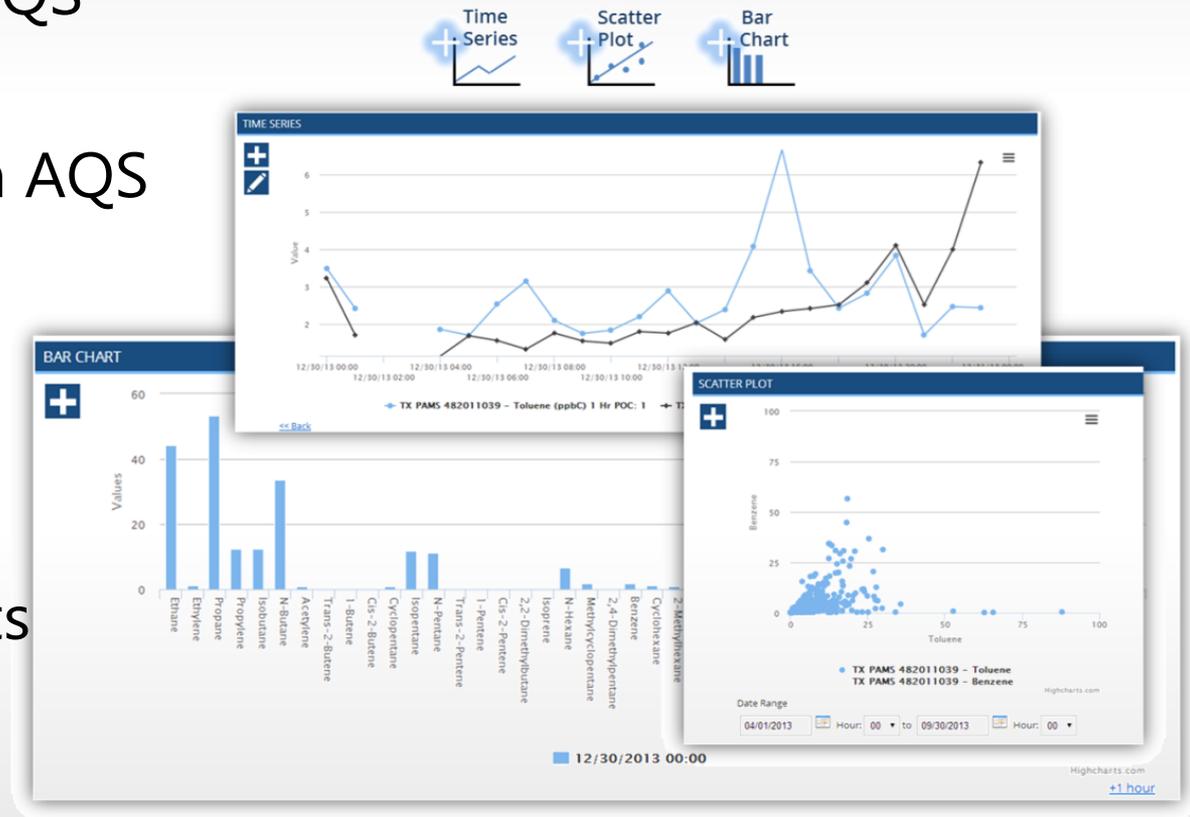
What is DART Now?

- Web-based application for acquiring, analyzing and screening data
- Useful for all types of air quality data (criteria, VOCs, toxics, etc.)
- Available in AirNow-Tech



Meet DART

- Prepare data for AQS
- Upload data files
- Request data from AQS
- Convert units
- Aggregate data
- Create time series and edit data
- Create scatter plots
- Create bar plots
- Screen data
- Export data and summary statistics



DART Version 2.0 – New Features

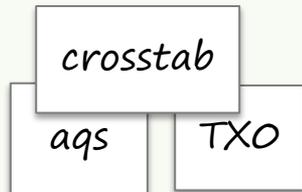
- **All-New Automated PAMS data screening**
 - “One-click” auto-screening provides interactive tables and plots to evaluate PAMS data
 - Screening checks based on recommended procedures in PAMS Data Analysis Workbook
- **Improved Data Imports**
 - Improved status information for data uploads and AQS requests
 - Unit conversions and customization of units on graphics

General Workflow in DART

1

Add data to DART

Manage



2

Explore data with graphs

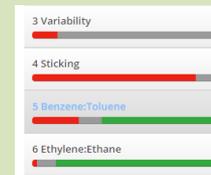
Explore



3

Perform validation

Validate



4

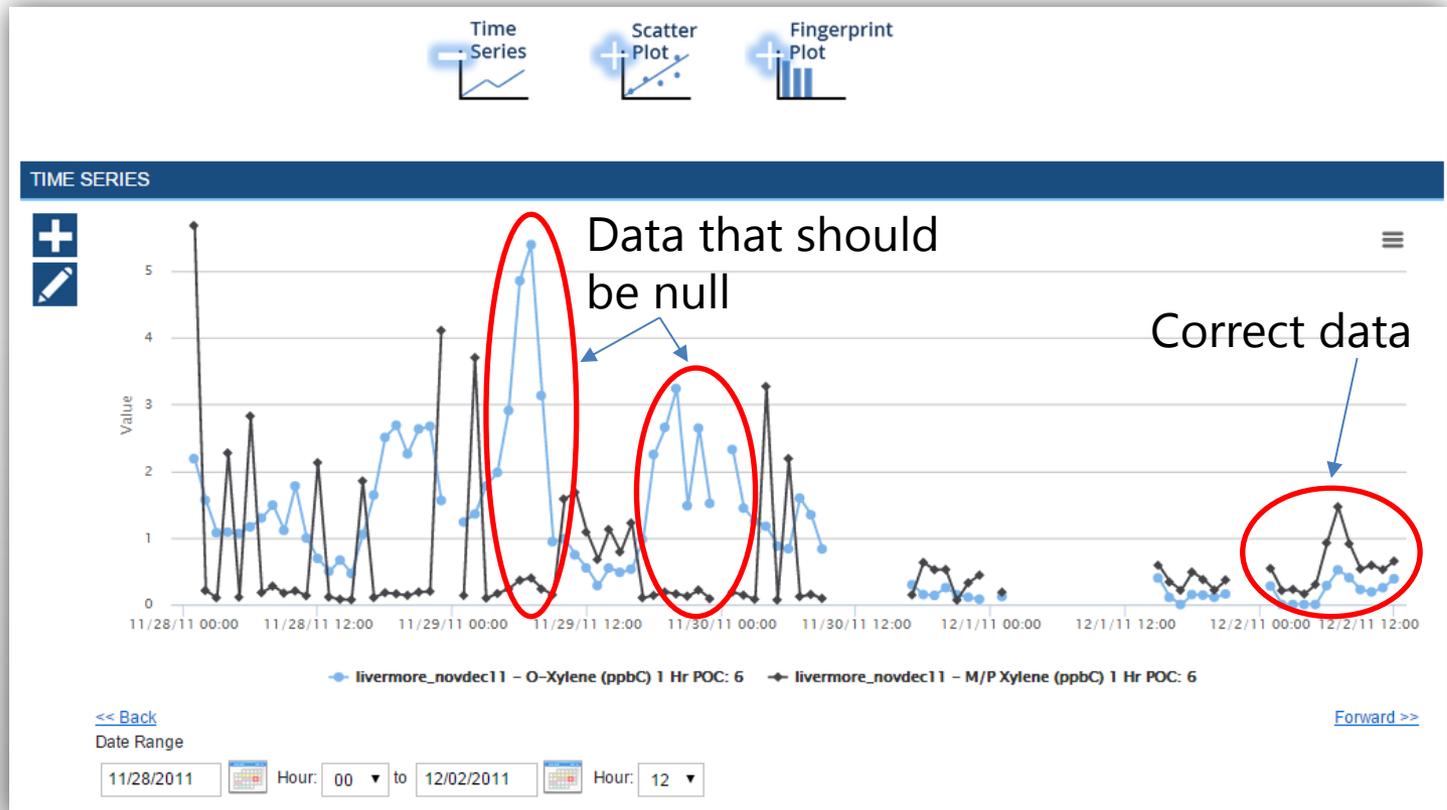
Export data and statistics

Export



Time-Series Graphs

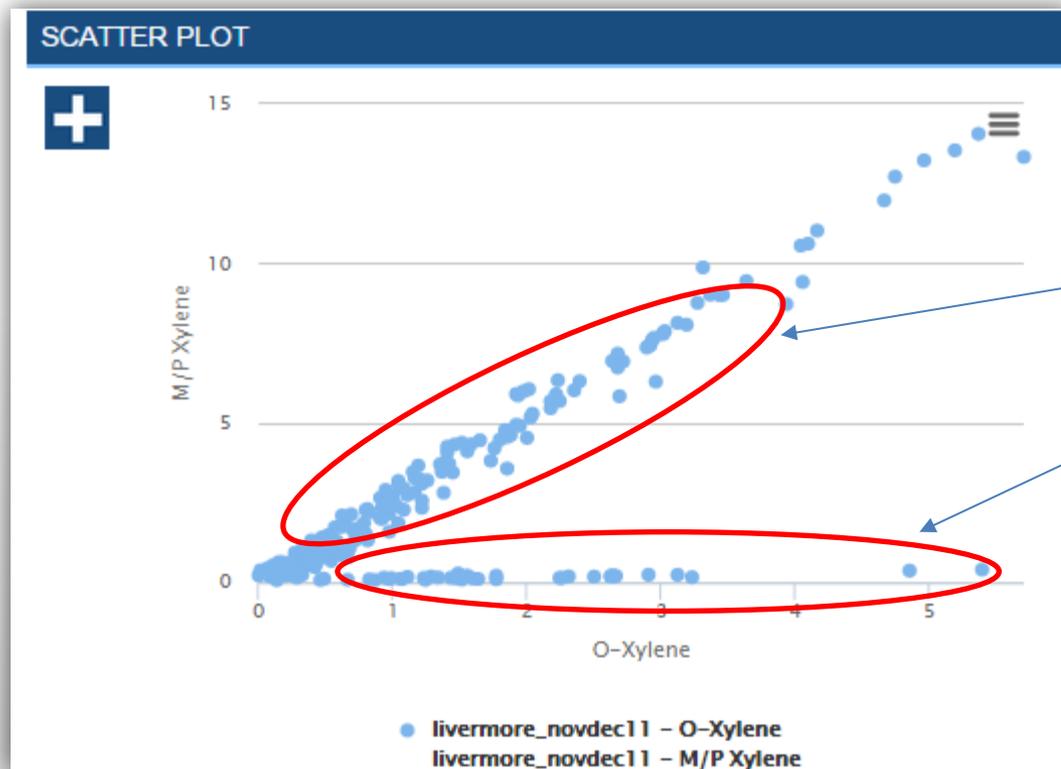
Time-series graphs are used to identify outliers, unusual data, trends, effects of meteorology in air quality, and changes in relationships among species



m/p-xylene is always > o-xylene in emissions and ambient air

Scatter Plots

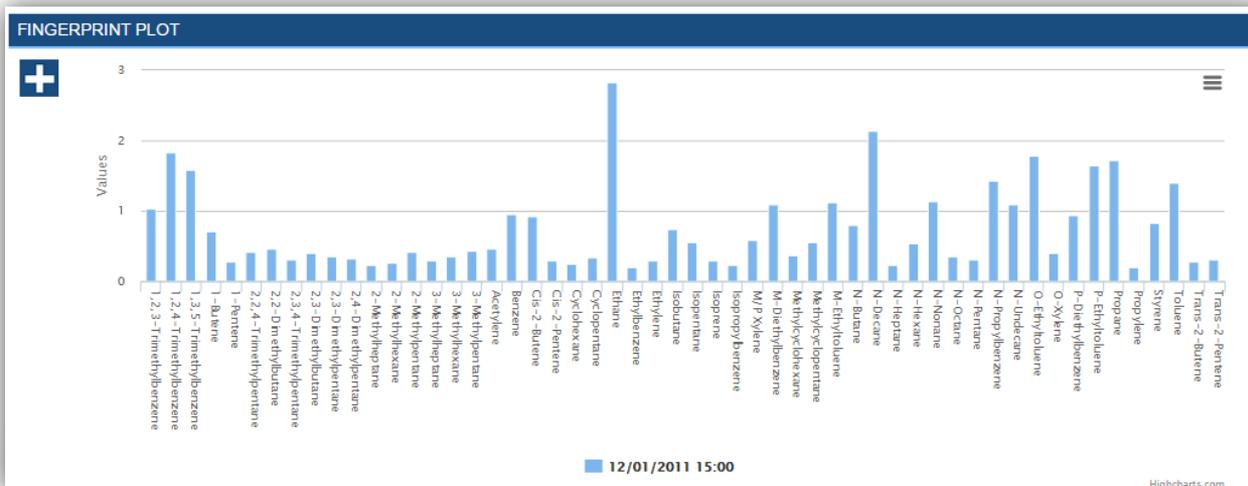
Scatter plots are used to identify outliers outside of usual patterns in the data; some species have typical relationships based on meteorology and emissions



*m/p-xylene is
always >
o-xylene in
emissions and
ambient air*

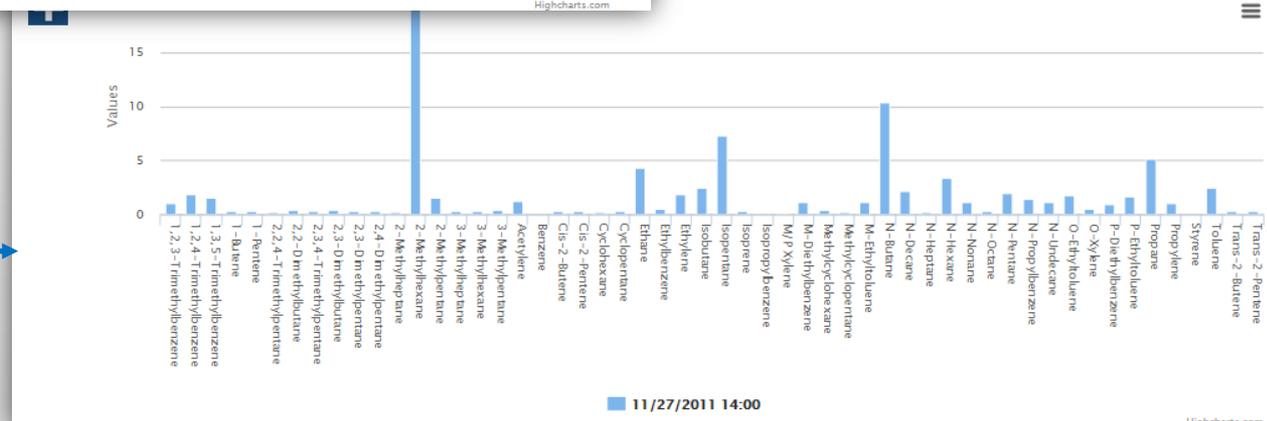
Fingerprint Plots

Fingerprint plots are used to scroll through data sample by sample to visually identify sudden changes in data



Good sample, typical of ambient VOCs

Unusual sample and likely bad data – examine this sample further using time series and scatter plots



Screening Checks ⁽¹⁾

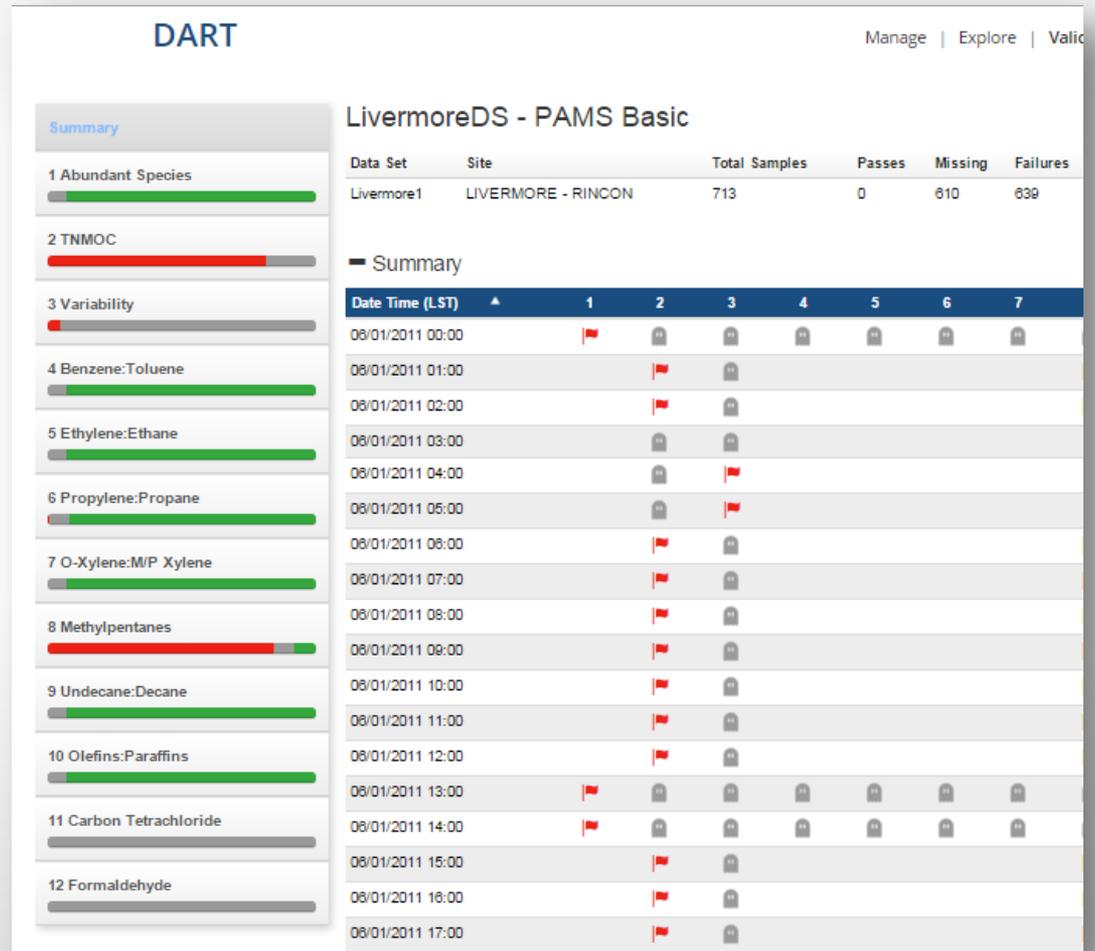
- Use screening checks to identify and export sample records that don't meet your conceptual model of ambient air quality or your sites, or that are physically unrealistic
- For example, look for samples with
 - High unidentified fraction (possible error in GC column, or data reporting error)
 - O-xylene > m/p-xylene (physically unreasonable, likely error in species identification)
 - Carbon tetrachloride below global background levels (physically unreasonable, likely error in sampling)
 - Sulfate > 3*sulfur (physically unreasonable, likely error on Nylon or Teflon filter)

Screening Checks (2)

- **Species Threshold** – identify data values that exceed threshold criteria
- **Species Variability** – identify data within a specified variability range
- **Species Comparison** – compare data values between parameters according to defined criteria
- **Species Fraction** – identify data values that are within a specified fraction of another data parameter value
- **Multi-Condition** – create data screening queries that meet more than one condition

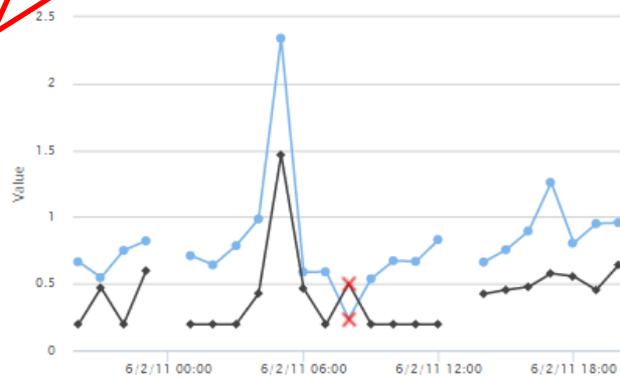
Automated Screening Checks (1)

- Run screening checks to identify problematic VOC data
- Review results in DART using interactive, linked tables and time-series graphs



Automated Screening Checks (2)

Use the "Edit Data" button to apply null or qualifier codes.



<< Back

Date Range

08/01/2011 Hour: 20 to 08/02/2011 Hour: 20

Y Axis

Minimum: 0 Maximum: 2.5 Fixed min/max

Graph

Summary

Propylene:Propane

Date Range: 08/01/2011 - 08/30/2011
 Samples: 13 Passes: 0 Missing: 610 Failures: 639 Null Codes: 692

Filter:

Reviewed	Date Time (LST)	DART Smart
<input type="checkbox"/>	08/01/2011 00:00	
<input type="checkbox"/>	08/01/2011 13:00	
<input type="checkbox"/>	08/01/2011 14:00	
<input type="checkbox"/>	08/02/2011 00:00	
<input checked="" type="checkbox"/>	08/02/2011 08:00	Propa Propyl
<input type="checkbox"/>	08/02/2011 13:00	
<input type="checkbox"/>	08/03/2011 01:00	
<input type="checkbox"/>	08/04/2011 01:00	

Select a row in the table to update the time-series graph.

Check the "Reviewed" box and click "Save" to mark the results as reviewed.

Save

The screenshot shows the AirNow Tech DART website interface. The browser address bar displays <https://www.airnowtech.org/dart/dartwelcome.cfm>. The page header includes the AirNow Tech logo, a user greeting "Welcome, Steve Brown!", and navigation links for "My Account", "Contact Us", and "Log Out". A main navigation menu contains "Agencies", "Sites", "Navigator", "Data", "Forecasts", "Polling", "Notifier", "Tools", and "Resources".

The main content area features a "Welcome to DART" section with the following text:
DART is your personal platform for air quality data validation and analysis!
You can upload your own air quality data or request it from AQS Data Mart.
Create graphs and use custom screens for data validation.
And use the DART export to prepare data for submission.

Below this text is a "Here's how to get started..." section with a numbered list item: "1 Add data to...".

Annotations on the page include:
- An orange circle around the "Help" link in the top right navigation menu, with an arrow pointing to a text box: "User's Guide from Help menu has details on data formats, how to make charts, etc."
- An orange circle around the "Feedback" button at the bottom right, with an arrow pointing to a text box: "Click 'Feedback' to send questions about your current screen, data, etc."
- A diagram below the "1 Add data to..." step showing a computer monitor icon, followed by an arrow pointing to a stack of document icons labeled "AQS" and "TXO", then another arrow pointing to a "crosstab" document icon, and finally an arrow pointing to a database cylinder icon with a checkmark.

Upcoming Features

- **Customized automated data screening**
 - Setup your own “One-click” auto-screening checks
- **Secondary y-axis for time series**
- **Delete data sets**

Future Feature Ideas

- **Interactive map for Data Mart AQS requests**
- **Suite of automated screening checks for air toxics**
- **Compare site to national statistics**
- **New analyses and plot types**
 - Plot concentrations and MDL values
 - Plot concentrations and annual averages
- **Support for more import file formats**

Summary

- DART is ready to use! Please let us know if you have questions or ideas for new features
- More new features to be deployed in November 2015
- After deployment, several webinars will be given
- Next phase of development to begin in 2016

Contact Us



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